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LINE SAMPLING DEVICE

The first suggestion considered for accomplishing the above purpose was a high-speed sampling system wherein all lines were sampled successively and decommutated at the receiving end of the line. This system was considered undesirable because of the complexity of the equipment involved and the difficulty of interpreting the received information.

It seems to us that a more desirable system could be evolved along the following lines: The lines under surveillance would be bridged by a high-impedance bridging amplifier feeding a modulator. The modulator would modulate a carrier oscillator operating at a frequency of perhaps between 6 and 10 kc. Each line under surveillance would use a different carrier oscillator frequency. The composite signal, consisting of all the oscillating frequencies, would be fed to the outgoing telephone line running to the observation point.

At the receiving end the carriers would be separated by appropriate filters and demodulated. Four separate and distinct channels having an audio quality substantially the same as that existing in the associated circuit would then be available.

The feasibility of the system, of course, depends basically upon the ability of the outgoing line to transmit the highest carrier frequency. If the filters at the receiving end are designed to discriminate sharply against all frequencies except the desired carrier frequency and its side

bands, a very considerable amount of amplification is possible at this point, and a received carrier of even a very few microvolts would be useful. For the sake of compactness and economy in power consumption, the amplifier-modulator-oscillator combination equipment at the sending end would be kept to a minimum and gain built up at the receiving end to compensate for lack of power at the transmitting end. The writer had some experience a good many years ago in a similar problem in connection with repeater stations for broadcast use. [redacted] 50X1

[redacted] 50X1

[redacted] Despite the high 50X1

frequency involved, sufficient signal is received over this line to permit amplification and synchronous rebroadcasting at a power of 100 watts.

Since the characteristics of the line over which the combined signals are to be transmitted are unknown, the first step in the proposed development would be to determine the highest carrier frequency desired and then to build a breadboard setup operating at this frequency for testing normal telephone circuits composed of various combinations of cable, open lines, etc. This testing could be done either with actual circuits or simulated lines in the laboratory. If the project seems feasible on the basis of this experiment, construction could then proceed on a compact set of equipment for the transmitting and less compact equipment for the receiving end of a complete system.